Questions week 3

1. Suppose constant propagation evaluates a \( \phi \)-function with two operands, having values 1 and 2. Which value will the algorithm record for the \( \phi \)-function?

2. Suppose now that the constant propagation algorithm not yet had marked the arc corresponding to the first operand as executable. Which value is then noted for the \( \phi \)-function?

3. What is the purpose of having an arc-worklist?

4. All statements in a vertex are interpreted only the first time the vertex is visited. Subsequent times only the \( \phi \)-functions are interpreted. Why is there no risk of missing any important by doing so? Which other worklist is exploited?

5. When does global value numbering think two instructions produce the same values?

6. Explain the difference between the \( N^2 \) algorithm and the \( N \log N \) algorithm for partitioning the instructions in global value numbering.

7. Where are \( \Phi \)-instructions inserted in SSAPRE?

8. What does downsafe mean?

9. When can an expression be available at a \( \Phi \)-function?

10. What is the purpose of the later attribute?

11. When will an expression be available at a \( \Phi \)-function?

12. What is the purpose of the avail_def array in finalize1?